

ACCESSION #: 9610280010

LICENSEE EVENT REPORT (LER)

FACILITY NAME: COMANCHE PEAK STEAM ELECTRIC STATION PAGE: 1 OF 5

UNIT 2

DOCKET NUMBER: 05000446

TITLE: AUTOMATIC REACTOR TRIP CAUSED BY LIGHTNING STRIKE

EVENT DATE: 09/18/96 LER #: 96-006-00 REPORT DATE: 10/18/96

OTHER FACILITIES INVOLVED: CPSES UNIT 1 DOCKET NO: 05000445

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:

50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:

NAME: RAFAEL FLORES - SYSTEM ENGINEERING TELEPHONE: (817) 897-5590

MANAGER

COMPONENT FAILURE DESCRIPTION:

CAUSE: SYSTEM: COMPONENT: MANUFACTURER:

REPORTABLE NPRDS: N

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On September 18, 1996, at approximately 12:45 p.m., during a severe thunderstorm a lightning strike caused Comanche Peak Steam Electric Station (CPSES) Unit 2 T sub cold channels II and IV to spike high which resulted in Overtemperature (OT) N-16 setpoint reduction and a subsequent trip signal. This completed the two-out-of-four logic for a reactor trip on OT N-16. All rods fully inserted into the core. The plant equipment response to the reactor trip was consistent with that expected for the existing plant

conditions.

The cause of the reactor trip was deemed to be lighting strike coupled with a ground which existed from the shield to ground on the spare Resistance Temperature Detector (RTD) in channel II and both the spare and active RTDs in channel IV. A Design Change was implemented to eliminate the ground.

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I. DESCRIPTION OF THE REPORTABLE EVENT

A. REPORTABLE EVENT CLASSIFICATION

An event or condition that resulted in a manual or automatic actuation of any Engineered Safety Feature (ESF) including the Reactor Protection System (RPS),

B. PLANT OPERATING CONDITIONS PRIOR TO THE EVENT

On September 18, 1996 Comanche Peak Steam Electric Station (CPSES) Unit 2 was in Mode 1, Power Operation, operating at 100 percent power.

C. STATUS OF STRUCTURES, SYSTEMS, OR COMPONENTS THAT WERE INOPERABLE AT THE START OF THE EVENT AND THAT CONTRIBUTED TO THE EVENT

There were no inoperable structures, systems or components that contributed to the event.

D. NARRATIVE SUMMARY OF THE EVENT, INCLUDING DATES AND APPROXIMATE

TIMES

On September 18, 1996, at approximately 12:45 p.m., during a severe thunderstorm a lightning strike caused the Channel II

and IV T cold to spike high which resulted in OT N-16 setpoint reduction and Channel IV to trip. This completed the two-out-of-four logic for a reactor trip on OT N-16. When the reactor tripped, the subsequent turbine trip caused the steam generator (EHS:(SG)(SB)) level to shrink below the Lo Lo level resulting in a Auxiliary Feedwater Pump (EHS:(P)(BA)) auto start, With the exception of Main Feedwater pump 2A, which tripped on overspeed, all other systems performed as designed. An event or condition that results in an automatic or manual actuation of any ESF, including the RPS, is reportable within 4 hours under 10CFR50.72(b)(2)(ii), At approximately 1:31 p.m. on September 18, 1996, the Nuclear Regulatory Commission Operations Center was notified of the event via the Emergency Notification System.

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E. THE METHOD OF DISCOVERY OF EACH COMPONENT OR SYSTEM FAILURE, OR

PROCEDURAL OR PERSONNEL ERROR

The Control Room Staff received an Overtemperature N-16 alarm.

II. COMPONENT OR SYSTEM FAILURES

A. FAILED COMPONENT INFORMATION

Not applicable - there were no component failures associated with this event.

B. FAILURE MODE, MECHANISM, AND EFFECT OF EACH FAILED COMPONENT

Not applicable - there were no component failures associated with this event.

C. CAUSE OF EACH COMPONENT OR SYSTEM FAILURE

Not applicable - there were no component failures associated with this event.

D. SYSTEMS OR SECONDARY FUNCTIONS THAT WERE AFFECTED BY FAILURES

OF COMPONENTS WITH MULTIPLE FUNCTIONS

Not applicable - there were no component failures associated with this event.

III. ANALYSIS OF THE EVENT

A. SAFETY SYSTEM RESPONSES THAT OCCURRED

The lightning strike caused channels II and IV T sub cold to spike high which resulted in OT N-16 setpoint reduction and channels II and IV to trip, This completed the two-out-of-four logic for a reactor trip on OT N-16, When the reactor tripped, the subsequent turbine trip caused

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the steam generator level to shrink below the Lo Lo level resulting in a Auxiliary Feedwater Pump auto start.

B. DURATION OF SAFETY SYSTEM TRAIN INOPERABILITY

Not applicable - there was no safety system train inoperability

that resulted from this event.

C. SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT

The subject reactor trip was caused due to a lightning strike, which spiked Unit 2 Channel II and IV T sub cold high. This condition resulted in the automatic reduction of the overtemperature reactor trip setpoint to approximately 64 percent Rated Thermal Power (RTP).

This event is bounded by the analysis of the turbine trip presented in Section 15.2.3 of the CPSES Final Safety Analysis Report (FSAR). The analysis uses conservative assumptions to demonstrate the capability of pressure relieving devices and to demonstrate core protection margins. The event of September 18, 1996 occurred at 100 percent reactor power, and all systems and components functioned as designed. The event is bounded by the FSAR accident analysis which assumes an initial power level of 102 percent and conservative assumptions which reduce the capability of safety systems to mitigate the consequences of the transient. It is concluded that the event of September 18, 1996, did not adversely affect the safe operation of CPSES Unit 1 or the health and safety of the public.

IV. CAUSE OF THE EVENT

On September 18, 1996, at 12:45 PM, while at 100 percent reactor thermal power (1151 MWe), Unit 2 tripped during a storm on an

Overtemperature (OT) N-16 signal. A lightning strike caused protection channel II and protection channel IV T sub cold loops to spike high, which lowered the N-16 over-temperature set point below the current reactor power causing the trip.

Troubleshooting consisted of physical walkdown to trace the involved cabling, cabinet inspections, meggering and the use of a Time Domain

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Reflectometer (TDR) to determine if there were any points where the N16 instrumentation was more susceptible to ground loop currents impacting the signal. During the troubleshooting of the two

channels which spiked, I&C Technicians (utility, non-licensed)

discovered that a ground existed from the shield to ground on the spare RTD in loop 2 and both the spare and active RTDs in loop 4.

The RTD for loop 2 was also suspect. However, further troubleshooting primary found no grounds on the shield for the RTD.

The shield of the spare RTD was found to be grounded near the ECSA pigtail. Since the ECSA pigtails and a length of unshielded signal

cables for both the spare and active RTDs for loop 2 are routed together. TU Electric believes that the circulating currents of the ground loop on the spare RTD's shield were induced into the active cable causing channel II T sub cold to spike high.

V. CORRECTIVE ACTIONS

A Design Change was implemented to eliminate the grounds discovered

during the trouble shooting of this event.

Although previous corrective actions seem to have prevented direct strikes of lightning to the containment structures, these actions were insufficient to prevent tripping of the units from lightning strikes. In response to previous lightning trips, TU Electric had formed a task team to evaluate previous lightning induced plant trips, and provide recommendations to management with respect to long term corrective actions. The September 18, 1996 plant trip has been included on the aforementioned task team's agenda.

VI. PREVIOUS SIMILAR EVENTS

There have been previous events that resulted in RPS actuation due to lightning strikes (refer to LER 445/90-028-00; LER 445/91-019-00, LER 445/91-021-00, LER 445/95-002-00 and LER 445/96-007-00). TU Electric had formed a task team to evaluate previous lightning induced plant trips, and provide recommendations to management with respect to long term corrective actions. The September 18, 1996 plant trip has been included on the aforementioned task team's agenda,

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Log # TXX-96493

File # 10200

TUELECTRIC Ref. # 10CFR50.73(a)(2)(iv)

October 18, 1996

C. Lance Terry

Group Vice President

U. S. Nuclear Regulatory Commission

Attn: Document Control Desk

Washington, DC 20555

SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION (CPSES)-UNIT 2

DOCKET NO. 50-446

ACTUATION OF REACTOR PROTECTION SYSTEM

LICENSEE EVENT REPORT 446/96-006-00

Enclosed is Licensee Event Report (LER) 96-006-00 for Comanche Peak Steam

Electric Station Unit 2 "Automatic Reactor Trip Caused by Lightning

Strike."

Sincerely,

C. L. Terry

By:

Roger D. Walker

Regulatory Affairs Manager

OB:ob

Enclosure

cc: Mr. L. J. Callan, Region IV

Mr. J. I. Tapia, Region IV

Resident Inspectors, CPSES

P. O. Box 1002 Glen Rose Texas 76043

*** END OF DOCUMENT ***
